

# Evaluation of a Dental Care Program

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THE AIM of the dental profession is prevention and treatment of oral diseases. With the increased demands by insurers and patients for more and improved treatment, the profession must project itself to the forefront by efficient delivery of excellent dental care to the population at large.

Dental care programs should be scrutinized in as great detail as possible. The scrutiny should be a continuing process, and it should involve as

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many dimensions related to the services as possible.

The dental unit of the Cleveland Department of Public Health and Welfare uses a four-dimensional approach to evaluate its program for elementary school children. The four dimensions, which are discussed in this paper, are (a) measurement of quantity of services needed and provided, as described in the "Record System" section, (b) measurement of the cost of services, (c) measurement of the quality of services as seen by the dentists, described under "Peer Review," and (d) measurement of parental perception of their children's treatment, described under "Consumer Evaluation." The methodology for creating an environment in which these four dimensions can be evaluated has been reported by Clark (1).

In addition to describing how each of these dimensions is measured, we report how one measure—cost of services—was used in making a major program change and describe the relationships among these measurements, as found in a limited study.

### The Record System

The basic form, on which the department records raw data on dental patients, is patterned after forms of the Indian Health Service (2) and the Division of Dental Health of the Philadelphia Department of Public Health (3). The form allows us to specify the services that are required and to record the services that are provided; for example, "diagnosis required—diagnosis provided," and "extraction required—extraction provided."

To supplement this information, the form also provides for recording circumstances beyond a dentist's control that cause him to perform inefficiently. These inefficiencies may be placed in three categories. The first category deals with provisions made by the administration; for example, has it provided adequate personnel, equipment, and supplies? Each clinic is provided with a checklist for preventive maintenance of equipment.

The second category deals with whether patients were unmanageable or untreatable and if they canceled or failed to keep an appointment. The third category deals with the activities of the dentist, such as whether his time on duty relates to his production.

All services performed are translated into a common unit of "surfaces," based on the amount of time required to perform the particular service.

Even the services that are not concerned with restoration of surfaces are translated into this common term; for example, diagnosis—2 surfaces, radiographs (5)—1 surface.

The total number of surfaces completed each month by each clinician is computed and translated into a dollar figure based on the clinician's salary. Thus, the cost per surface for each clinician can easily be translated and compared. Each clinician is then classified as average, above average, or below average. Those who are below average are asked to increase production and thereby reduce cost. Also taking into account costs for supplies, maintenance, and other personnel, we can justify withdrawal or addition of resources, clinicians, or other personnel.

### Costs

The tabulations presented in this section comprise a case report on the dental clinic at the Newton D. Baker Health Center, which was beset with administrative problems. Analysis of the data generated through the record system indicated that the Baker clinic should be closed.

As shown in the following table, there was a notable difference in services and costs between the Baker clinic and the other four clinics.

Clinic	Surface per session		Total	
	Average number	Average cost	Surfaces	Salaries
Newton D. Baker	3.73	\$7.66	3,835	\$29,391.40
Gilbert	7.37	3.04	4,651	14,172.06
Gordon	6.54	3.73	3,848	14,366.54
Harvey Rice	6.32	3.37	3,426	12,809.95
Case	4.24	5.58	3,827	21,349.20
Total	5.64	\$4.75	19,587	\$92,089.15

A comparison of cost per surface for four clinicians who were employed at both the Baker clinic and one other clinic showed that the cost at Baker was \$7.66 while at the other clinic it was \$4.71. The following figures show the differences in average surface per session for each clinician at both clinics.

Clinician	Average surface per session	
	Baker	Other clinic
Dr. A	2.7	5.4
Dr. B	3.9	3.8
Dr. C	4.6	5.6
Dr. D	3.8	5.3

Production, cost of consumable supplies, and staff at the Baker clinic in 1966 and 1971 were as follows.

Item	1966	1971
Number patients with complete dental work .....	764	408
Number surfaces completed .....	10,670	3,385
Cost of consumable supplies .....	\$3,892	\$3,892
Total staff:		
Part-time dentists .....	6	6
Full-time dentists .....	7	3
Part-time dental students .....	4	0

After the data on the cost of operating the clinic and the administrative problems were considered, the facility at the Newton D. Baker Health Center was closed.

### Peer Review

As recommended by the Committee on Quality Control of the Cleveland Department of Public Health and Welfare, a peer review board was established. By a simple majority vote, the dentists made the following decisions: that the review committee consist of three examiners selected from the department in alphabetical order; that each year a review of the work completed on five patients of each department dentist be conducted; and that the criterion used in the review be that the outline form of the restoration be designed according to the outline of Black (4). Items to be checked in the review include lost restorations, broken margins, broken isthmuses, evidence of traumatic occlusion, postoperative bite-wing radiographs for caries and overhang, and extension of preventive services. For the first year's review, the dentists were allowed to select their own patients, but the following year they agreed to random selection of patients.

The department's dental unit has 19 clinical dentists on its staff. All the examiners and the clinical dentists were identified by code. The three examiners' scores were compiled and averaged. If the average score for a clinician was between 0 and 1 point, he was classified as excellent; between 1.1 and 3 points, satisfactory; and more than 3 points, unsatisfactory. The first-year results showed 15 excellent and 3 satisfactory clinicians. (One endodontist was not evaluated because the form for scoring his work had not been completed.) The scores were mailed to the clinicians.

### Consumer Evaluation

The ultimate test of the quality of care must include some reaction from patients. Since the quantity of service is evaluated through the record system and the quality by peer review, the pa-

tients' parents were asked for an evaluation according to their perception of the quality of services provided and the staff's treatment of their children.

*The questionnaire.* The following questions, requiring yes or no responses, were sent to the parents.

1. Have you talked to your child about the school dental clinic?
2. Has your child been told about ways in which he can help keep himself free from dental disease?
3. Are you satisfied with your child's dentist?
4. Have you or your child been told what is to be done in his mouth?
5. Has your child ever told you that the dentist or dental assistant did not treat him "right"?
6. Has your child been told what to expect after the dentist gives him a "shot"?
7. Does your child complain of waiting more than 1/2 hour to be seen by the dentist?

*Responses.* Of 140 questionnaires mailed, 99 were returned. We tabulated only the responses of 96 respondents who answered yes to the first question. The remaining 6 questions multiplied by the 96 respondents gave a cumulative figure of 576 questions. Of these, 56 were answered negatively; thus, there was a total of 9.7 percent negative responses to the total number of questions. The results were judged against an arbitrary scale: 0-9 percent negative responses, excellent; 10-29 percent negative responses, satisfactory; and 30-100 percent negative responses, unsatisfactory.

Sixty-two of the 96 respondents added comments to the questionnaire. The comments that evaluated treatment were scored as positive or negative. The comments were generally positive; there were 80 "good" comments and 21 "bad" comments.

When the responses to questions 2-7 were examined individually, three questions were placed in the excellent category and three in the satisfactory category. The most positive response was to question 2, pertaining to whether the child had received advice on preventing dental disease; 93 percent of the respondents said yes. The next most positive response was to question 3; 95.8 percent of the respondents indicated satisfaction with the dentist. Next highest was question 6; 91.7 percent of the respondents said the child had been told what to expect after the dentist gave him a "shot." Question 4, concerning whether the child or parent had been told of treatment plans, was

answered positively by 88.5 percent of the respondents. Slightly fewer, 87.5 percent, reported that the child was "treated right" by the dentist and the hygienist. Question 7 received the lowest positive response; 81.2 percent of the respondents reported waiting ½ hour or less.

### Relationship of Measurements

Scores were obtained for three measures—quantity, quality, and parental opinion of quality of dental care services—for 54 patients. The following data were obtained for all 140 children included in the survey.

Measure	Questionnaire		Total
	Completed	Not completed	
Quantity and quality .....	54	17	71
Quantity only .....	41	24	65
Quality only .....	1	0	1
Neither quality nor quantity .....	0	3	3
Total .....	96	44	140

The correlations between measures were as follows.

Measure	Quality	Questionnaire	Comments
Quantity of service ..	+0.21	+0.16	+0.04
Quality of service .....		-0.16	-0.26
Questionnaire .....			+0.42

The first relationship examined was between quantity of service, measured as average number of surfaces per session, and quality of service, measured by peer review. The relationship suggests that over the range studied, 3.4–8.3 surfaces per session, the quality increased slightly when the number of surfaces increased.

The next relationship examined was between quantity of service and parental opinion of care. The finding here can also be interpreted positively—the notion that faster work leads to patient dissatisfaction is not supported.

In examining the relationship between quality of care—as measured by peer review—and parental opinion, we used the data on 55 children for whom questionnaires were returned and peer review ratings were available. The correlation of quality with questionnaire scores was  $-0.16$ . Although this is not a statistically significant finding, it indicates that increased quality was related to decreased favorable opinion. The correlation between quality and parental opinion, as measured by the number of positive comments, was  $-0.26$ ;

this correlation of borderline significance at the 0.05 level also suggests that parental opinion of care decreases as quality rating by peers increases.

Finally, we examined the relationship between the two measures of parental opinion—responses to the questions and the comments—using the 96 returned questionnaires. The correlation was 0.42, which indicates a positive relationship; but these two measures also largely assess different perceptions of care.

In summary, then, the relationship between the quantity and quality of services suggests that as the number of surfaces increases, there is a slight increase in quality of services. There was a similar relationship between quantity of care and parental opinion of care—a small but not statistically significant positive relationship. The relationship between quality of care and consumer evaluation of care indicates that an increase in quality was related to a decrease in favorable opinion, but the relationship is not statistically significant. The correlation between quality and opinion as measured by parental comments also suggests that consumer evaluation decreases as quality measured by peer review increases. The relationship between the two measures of parental opinion indicates a positive relationship.

### Conclusion

We have made a preliminary effort to combine four measures of program performance for evaluation of a dental care program. The concept of viewing four dimensions of a program at once and measuring them against each other enables us to make more intelligent program adjustments.

Our measures and their application need more refinement, but we have already accumulated information that is useful for program planning and operation.

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